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Lemurs in Bemaraha (World Heritage Landscape, Western Madagascar)

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A visit to the Tsingy de Bemaraha in Western Madagascar was undertaken in 1991 to survey the lemurs of this little known reserve. Preliminary results of field observations and interviews with local inhabitants are presented together with notes on the forests, the human population and the conservation status of the region.

Introduction

The Reserve Naturelle Intégrale Tsingy de Bemaraha is the largest reserve in Madagascar (1520 sq km) and has recently been classified as a World Heritage Landscape by UNESCO. The calcareous plateau of Bemaraha with its spectacular pinnacles (*tsingy*) in the southern part rises from about 100 m in the west to 850 m in the east, and drops precipitously to the valley of the Manambolo in the south. The climate is seasonal, with rain from November to April and a dry season of 6–8 months. The mean annual temperature exceeds 26°C (Nicoll and Langrand, 1989).

In 1990 two of us (TM, UT) discovered a population of *Avahi* (woolly lemur), which was provisionally identified as *Avahi* cf. *occidentalis* (Mutschler and Thalmann, 1992; taxonomy for *Avahi* according to Rumpler *et al.*, 1990). A follow-up visit was organized in 1991 to study this population in more detail and to carry out a survey of the lemur species, updating the faunal list of Nicoll and Langrand (1989). The results of the lemur study are presented here and the detailed results of the *Avahi* study will be presented elsewhere (Thalmann *et al.*, unpubl. data).

Methods

An initial flight over the southern part of the reserve yielded an overall impression of the vegetation and the extent of forests. Because no car was available and public transport facilities do not exist in the study region, the ground survey was very limited. In order to look for *Avahi*, surveys on foot were carried out by day and night in a forest near Bekopaka (16–18 September) and in the surrounding forests of the camp site near Ambalarano (22 September–14 October, Figure 1). During these walks, other lemurs were often encountered. At night, headlamps and night-vision apparatus (Leica WILD BIG-3) were used to identify species.

Interviews were undertaken by one of us (NR) with our guide Monsieur Félix (7–10 October). Fifteen people from seven villages (Figure 1) were interviewed to collect information on local human inhabitants and their use of the forests as well as information about lemurs, particularly *Avahi*, *Hapalemur* and *Daubentonia*.

Results

Human population

Each village had 10–50 inhabitants. Many people belong to the Sakalava du Menabe tribe, which was once politically dominant. A few consider themselves to be Vazimba, sometimes believed to be a legendary tribe of Madagascar (e.g. Bradt, 1990; but see Sibree, 1915; Birkeli, 1936; Lombard, 1988). The Vazimba were the first people to settle in this region; the Sakalava immigrated later and

now there are immigrants from many other tribes: Antaimoro, Antandroy, Antanosy, and Bara from the south, Betsileo from the southern highland, and Korao from the south-east.

Forests

The forests are mainly of the western dry deciduous type, especially on the plateau. Two types of subhumid forest also occur close to the western precipice and in a number of depressions outside the reserve. At the end of the dry season, these forests are still green. The subhumid forest along the tsingy is an interrupted band along the western border of the reserve. The main canopy reaches about 11 m with emergent trees of 15–22 m. The most frequent tree species are the *litsake* (*Symphonia* sp.) and *honofts-akoho* (*Mussenda laudia*). Light penetration is relatively high and the undergrowth is correspondingly relatively dense. The second type of subhumid forest has a main canopy layer at a height of about 15 m, and emergent trees reach a height of 20–32 m. Light penetration is less effective and undergrowth is very limited. In this forest the most frequent tree species are the *ampolindrano* (*?Vepris* sp.) and the *rotsy* (*Eugenia* sp.).

Most villages are within 2–5 km of a forest, which is used for cattle pasture, hunting

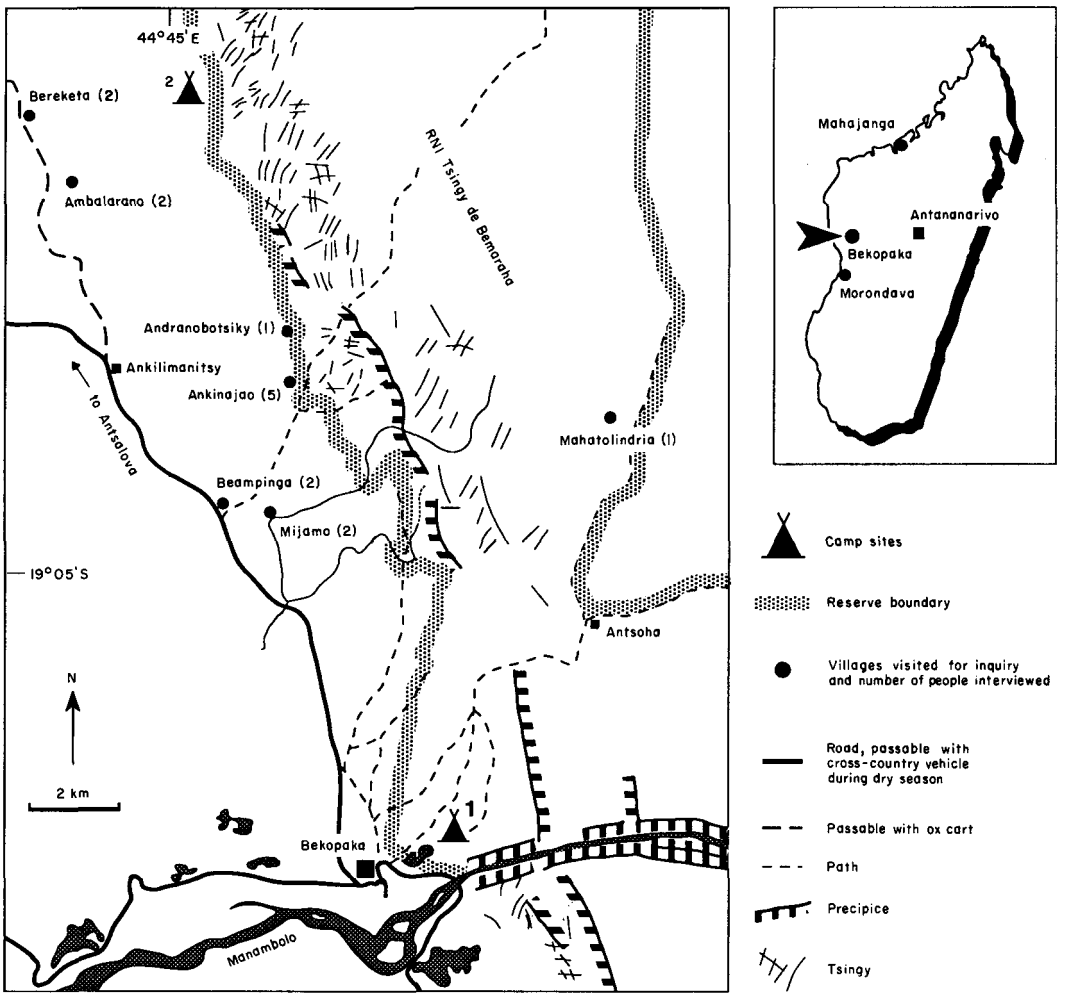

Figure 1. Map showing location and detail of study area (*IGN, 1969*).

(mainly birds and lemurs) and gathering (e.g. medical plants, honey), as well as a source of wood for fuel and construction of houses and cattle-pens.

Lemurs

Information on lemurs is summarized in Table 1. Nine lemur species were seen during our surveys. We failed to find *Daubentonia*, but its presence was reported by three local people. An unidentified species, with the local name of *malagnira*, was mentioned by two related people. Six lemur species were considered to be rare by one or several interviewees. Three species were said by people to be *fady* (=taboo) on at least one occasion: *Propithecus verreauxi deckeni*, *Phaner furcifer*, *Mirza coquereli*. In general, however, lemurs are not fady.

Daubentonia sp. The local name, *bekapaky*, describes the knocking sounds this animal makes. Of the three people reporting the bekapaky, one claimed to have seen it in the late 1960s in the Maromena forest within the reserve. When directly asked about the bekapaky, three further people said they knew the noise, and three reported that they had only heard stories about the animal.

Avahi cf. *occidentalis*. *Dadintsifaky*, the local name for this species, means grandparent of the sifaky. They are similar in appearance to *Propithecus*, but are believed to be older because they are darker and smaller.

Hapalemur g. occidentalis. The local name, *bekola* (*be*=big; *kola*=wound, also syphilis) refers to the glandular area on the inside upper arm, particularly well developed in males (Tattersall, 1982). *Hapalemur* is not valued as food because some local people fear that they could become infected with syphilis if they were to eat the animal.

Phaner furcifer. (Local name: *tanta*). Several people said that the meat of this species is bitter and repellent and they would not eat it.

Propithecus v. deckeni. In addition to the well-known belief that these lemurs (local name: *sifaky*) are the ancestors of mankind (e.g. in the Antandroy tribe), one person told a more detailed story. Once sifaky were human, but they were transformed into their present form because the 'tromba' (a bad ancestral spirit) entered their bodies. They are not hunted by people who believe this story because they fear that the 'tromba' will change host.

A male woolly lemur (*Avahi* cf. *occidentalis*) from Bemaraha at a sleeping site during the day (*Thomas Mutschler*).

Malagnira. The malagnira is claimed to be similar to the *tilintilivaha* (*Microcebus*), but smaller and with different behaviour.

Discussion

Human population

Human population density in the region is still relatively low although up-to-date census

data are not available. The original inhabitants of the region are very hospitable, and immigrants do not encounter many problems. Most immigrants come from the south, leaving regions that are increasingly threatened by drought. Population pressure is increasing and will probably accelerate in the future. By tradition, immigrants from the south are more likely to burn down the remaining accessible forests for agriculture and settlements, even within the reserve (H. Rabetaliana of UNDP, pers. comm.).

Forests

Access to some forests in the southern part of the reserve is difficult because of the tsingy. Wherever forests are accessible, especially along reserve boundaries and outside (although borders of the reserve are unclear, F. Busson of UNDP, pers. comm.), they are heavily threatened by deliberate burning. The subhumid forest along the reserve's western boundary has already been almost or completely eliminated right up to the western precipice. It is possible that these partially evergreen forests serve as migration corridors for animals and as a refuge during the dry season, so disruption of the area is alarming. Furthermore, the subhumid forests represent unusual plant associations within the western region, where most other forest trees are leafless between the end of July and the beginning of November (Koechlin *et al.*, 1974; Rohner and Sorg, 1989).

Lemurs

Published distribution maps (Petter *et al.*, 1977; Tattersall, 1982) show eight species of lemurs for Bemaraha or nearby regions. In addition, Tattersall (1982) indicates a museum specimen of *Avahi* 200 km further south (Morondava). But the provenance of this specimen cannot be confirmed (Mutschler and Thalmann, 1992). Nicoll and Langrand (1989) listed seven species for the reserve together with an additional species for a nearby region, again totalling eight species in all. Whereas it now seems very probable that *Daubentonia* occurs in the region (see also Petter and Andriatsarafara, 1987), our discovery of *Avahi* extends the known distribution range of the species more than 350 km to the south. There is some evidence that *Avahi* from Bemaraha differ from those of Ankarafantsika/Ampijoroa near Mahajanga, but it is not yet clear at which taxonomic level.

Nine lemur species are definitely present in Bemaraha (Table 1), and it is probable that the

Table 1. Occurrence of lemur species at Bamaraha, based on surveys and interview results

Scientific name	Vernacular name	SV	Interviews			
			N	R	F	ST
Microcebus murinus	Tilintilivaha	+	14	1	–	A
Propithecus verreauxi deckeni	Sifaky	+	13	–	2	V
Lemur fulvus rufus	Gidro	+	11	–	–	R
Cheirogaleus medius	Kelibehoy	+	10	8	–	A
Hapalemur griseus occidentalis	Bekola	+	10	1	–	V
Phaner furcifer	Tanta	+	10	2	2	R
Lepilemur edwardsi	Boenga	+	9	–	–	R
Avahi cf. *occidentalis*	Dadintsifaky	+	5+2*	4	–	V
Daubentonia sp.	Bekapaky	–	3+6*	3	–	E
Unknown	Malagnira	–	2	–	–	–
Mirza coquereli	Kifonjitsy	+	1	–	1	V

SV, results of survey. Interviews: results include the number of local inhabitants reporting a species (N), considering a species to be rare (R), and considering a species to be 'fady' (taboo, F). * Additional counts obtained by asking directly about these species. ST: conservation status according to IUCN (Harcourt and Thornback, 1990): A, abundant; V, vulnerable; R, rare; E, endangered.

occurrence of *Daubentonia* will be confirmed by sightings soon. We failed to confirm the presence of the malagnira. According to R. D. Martin (pers. comm.), Petter (1962), and Tattersall (1982), it is possible that two forms of *Microcebus* exist sympatrically in the west, but we did not pay special attention to this problem. There are, however, obvious differences in *Microcebus* density. Near Camp 1, *Microcebus* was one of the most frequently spotted animals during each night walk. Near Camp 2, we first saw *Microcebus* only during the fifth night of intensive surveying, and never in such high frequencies as near Camp 1. We cannot provide an explanation for these differences.

The nine identified species, and possibly *Daubentonia*, indicate a considerable diversity of lemurs for a western biotope, where reliable data is available. Only seven species are known both in Kirindy (about 150 km to the south, across the rivers Manambolo and Tsiribihina), and in Ankarafantsika/Ampijoroa near Mahajanga (Nicoll and Langrand, 1989). *Daubentonia* may also be present in Ankarafantsika (Decary, 1950; Kaudern, 1915; Tattersall, 1982), but evidence is still weak.

Although lemurs are protected by national and international legislation (for details see Harcourt and Thornback, 1990), they are hunted in considerable numbers in western Madagascar (Favre, 1989 unpubl. data, 1990). Nevertheless, habitat destruction through burning in order to gain new land for agricultural purposes is the most important threat, as is the case everywhere in Madagascar.

Conservation

The UNDP recently initiated à MAB project (Man and Biosphere) in the region, as proposed by Petter (1988). Meanwhile, a project base has been opened at Antsalova, an airstrip has been built near Bekopaka, and a second base at Bekopaka was planned for construction (R. Albignac, UNDP, pers. comm.) while this article was being written. Consequently, considerable efforts are under way to preserve the whole region, including the RNI Tsingy de Bemaraha.

In addition to several other objectives, the project aims to promote 'ecological tourism'. Indirect advertisement has already started in popular magazines (e.g. Meister and Lanting, 1991) and on French TV (P. Schmid, pers. comm.). Excursions to Bekopaka are offered by travel agencies in Morondava, and public transport (taxi brousse) has reached Bekopaka twice a week since 1991. Nevertheless, virtually no tourist facilities are present in Bekopaka and there are not enough guides. A Reserve Naturelle Intégrale may only be visited by officials of the Water and Forest Department and scientists with permission from Malagasy governmental authorities. It is not possible to obtain permission in Bekopaka or in Morondava.

There are obviously legal and socioeconomic problems to be solved in developing the area for tourism. We sincerely hope that everybody involved will draw lessons from the events in Périnet-Andasibe during the 1980s. There, guides demanded exaggerated salaries (personal observations in 1987 and Bradt, 1990). Subsequently, one of them spent much money on alcohol. The sad story ended with the death of this once excellent and well-known young man (Bradt, 1990: 93). Development of tourism should be undertaken very carefully, in order to avoid, as far as possible, any form of negative impact on either the social or ecological character of the region.

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